

Background Paper 3

Drylands

ACKNOWLEDGEMENTS

This report is the result of a joint co-operation between FAO and IFAD.

The main document and the FAO case studies data sheets were prepared by Ivo Morawski, FAO consultant. The IFAD case studies data sheets and analysis by Rudolph Wiersinga, IFAD consultant. Dominique Lantieri, Secretary of the FAO interdepartmental working group on desertification (SDRN), was responsible for overall technical coordination. The document also benefited from comments provided by various FAO technical services (FORC, AGLS).

Richard Trenchard from the Executive Bureau of the FAO/Netherlands Conference on the Multifunctional Character of Agriculture and Land was responsible for final editing of the document and its incorporation into this volume.

Drylands and the MFCAL Approach.

Background Paper 3: Drylands.

INTRODUCTION

This paper reviews processes, patterns and trends of agriculture and land use in dryland areas. It also explores the extent to which an approach directed at the multifunctional character of agriculture and land – the MFCAL Approach - can help address the greatest challenge facing drylands, namely combatting desertification. The discussion opens with a review of the MFCAL Approach leading to the design of a simple referential matrix which provides the basis for subsequent analysis. Attention then turns to the related themes of drylands and desertification, focusing on the implication of these issues for both drylands countries and drylands populations. The paper then assesses the field experiences of various partners world-wide using case studies collected from both two separate databases - the *FAO/Netherlands MCS Database* and the IFAD project database. The analysis identifies the key factors shaping both success and failure in drylands areas and extracts key lessons for the future sustainable development of drylands and for combating desertification. Finally, the paper translates these findings into a preliminary set of normative guidelines and recommendations for improved project cycle management in drylands and for heightened coherence in policy formulation and decision-making process.

1. MFCAL AND DRYLANDS: THE ISSUES AT STAKE

THE MFCAL APPROACH

The MFCAL Approach provides the overall referential framework for this paper. The approach recognises that the first and foremost role of agriculture remains the production of food. It stresses however, that agriculture and related land use activity can also deliver a wide range of non-food goods and services, influence the natural resource system, shape social and cultural systems and can contribute significantly to economic growth. The approach also focuses on the trade-offs and synergies that can exist between these different functions.

The first dimension of the multifunctional character of agriculture and related land use concerns food production and the contribution that this makes to food security. Food security has been defined by FAO as a situation in which all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. There are three dimensions implicit in this definition: availability, stability and access. Adequate food availability means that, on average, sufficient food supplies should be available to meet consumption needs. Stability refers to minimising the probability that, in difficult years or seasons, food consumption might fall below consumption requirements. Access to food draws attention to the fact that, even with bountiful supplies, many people still go hungry because they are poor and unable to produce or purchase the food they need. In addition if food needs are met through exploiting non-renewable natural resources or degrading the environment there is no guarantee of food security in the longer-term.

Current concerns for food security stem from both the unacceptability of current levels of food insecure people (at least 800million people) and the recognition that agriculture will have to feed an increasing human population, forecast to reach 8 000 million by 2020, of whom 6 700 million will be in developing countries. In most developing countries, the majority of the poor live in rural areas and depend on agriculture for their livelihoods.

Expanding food production to feed this increasing population, while alleviating poverty through gainful employment in agriculture, is a formidable challenge.

In addition to food production and the vital contribution that it makes to food security, the MFCAL Approach recognises three further broad functions 1) environmental 2) economic 3) social.

The Environmental Function. Agriculture and related land use can have beneficial or harmful effects on the environment. The MFCAL approach can help to identify opportunities to optimise the linkages between agriculture and the biological and physical properties of the natural environment. The environmental function of the MFCAL Approach is relevant to a number of critical global environmental problems including biodiversity, climate change, desertification, water quality and availability, and pollution.

The Economic Function. Agriculture remains a principal force in sustaining the operation and growth of the whole economy, even in highly industrialised countries. Valuation of the various economic functions requires assessment of short, medium and long-term benefits. Important determinants of the economic function include the complexity and maturity of market development and the level of institutional development.

The Social Function. Both the maintenance and continuing dynamism of rural communities are basic to sustaining agro-ecology and improving the quality of life (and indeed, to assuring the very survival) of rural residents, particularly of the young. On another level, the capitalisation of local knowledge and the forging of relationships between local and external sources of expertise, information and advice are fundamental to the future of existing rural communities. Social viability includes maintenance of cultural heritage: for we know that in many instances, societies still identify strongly with their historical origins in agrarian communities and rural lifestyles.

For the specific purposes of this discussion, a simple interpretive matrix has been developed. This will act as broad referential framework for the subsequent analysis. It includes eight categories of functions and related impacts. The list is derived from the *Scoping Phase* of the preparatory process of the *FAO/Netherlands Conference on the Multifunctional Character of Agriculture and Land*. These categories were identified in a series of consultative exercises that took place in late 1998 and early 1999 and formed the basis of the subsequent empirical and conceptual development of the MFCAL Approach. Although there is a general acknowledgement of their interactions and synergies, no attempt is made to assign pre-defined relations, causes, effects and the specific relationships between the functions. Every situation is site, time, or scale-specific and depends on a wide range of combinations and influencing factors. However, trends and general patterns can characterise similar natural, economic and/or social environments. The aim of this paper is to analyse the relevance, applications and response of MFCAL functions for drylands.

Table 1 :Assessing the Impacts of the Multifunctional Character of Agriculture and Land

a. Contributions to food security	e. Contributions to social cohesion
Production of food goods for home consumption	Enhanced/maintained life in rural areas (including recreational areas)
Production of food goods for the market	Promoted participation of wide range of stakeholders
Enhanced reliability of food source or income	Increased public awareness/common vision of sustainability issues
Improved income and access to food	Strengthened cultural identity/cohesion/harmony
Improved nutrition	Preserved cultural patrimony
Diversification of food and food source	

Better connection between consumers and food source	Motivation and authority of natural resource users
b. Contributions to policies and institutions	Improved education and capacity
Increased political stability	f. Contributions to environmental restoration, protection and enhancement
Institutions formed or strengthened	Increased water availability on sustainable basis
More integrative or participatory institutions and/or decision-making	Increased cycling of organic materials
Improved coherence in policies, regulations and standards	Improved integrated plant nutrition management
More equal representation and empowerment of a wider range of stakeholders	Improved pest management and control
Strengthened information exchange and networking	Improved resilience of production systems
Developed effective mechanisms to negotiate conflicting land use needs	Improved resilience of ecosystems
c. Contributions to economic development	Improved air, water and soil quality
Production and profitability of non-food goods for domestic utilisation	Conserved and sustainably utilised biological diversity (including plant and animal genetic resources)
Production of internationally tradable goods	Regenerated landscapes
Identification and development of new market opportunities	Promoted renewable inputs and recycling of natural resources
Added value to marketed goods/services	g. Contributions to science, technology and knowledge
Mitigated impact of urbanisation on agriculture resource use	Advances in scientific knowledge
Diversification of farm and non-farm employment	Technology development and its transfer
Employment generation	Increased use of local and traditional knowledge and technologies
Provision of recreation areas for revenue	h. Contributions to management of land resources
d. Contributions to poverty reduction and equity	conserved/enhanced soil fertility/soil productivity/soil nutrient management
Enhanced/maintained sustainable livelihoods in rural and urban areas	conserved/enhanced soil health (including reduction in soil pollution)/soil biodiversity
Increased gender equity	conserved/enhanced agricultural biodiversity
Increased reliability of income sources for disadvantaged groups	Decrease in rates of land degradation
Enhanced human and social capital of disadvantaged groups	Recuperation of degraded land(scapes)
	Enhanced use of soil conservation technologies

1.2 THE CHARACTERISTICS OF DRYLANDS

Drylands are areas with limited water resources. This first aspect of drylands is therefore based on their **climatic** character. Rainfall is scarce, unreliable and concentrated during a short rainy season with the remaining period tending to be relatively or absolutely dry. High temperatures during the rainy season cause much of the rainfall to be lost in evaporation, and the intensity of tropical storms ensures that much of it runs off in floods. Water supply is not only meagre in absolute terms but also of very limited availability for human and natural uses. The two dominant characteristics of dryland climates are **aridity** and **variability**. Several classifications of drylands have been developed. The FAO typology for example, is based on agroclimatic zones defined according to the Length of Growing Period – LGP (production perspective) - and is outlined below.¹

¹ LGP is defined as the duration when both water and temperature permit crop growth

.FAO classification of drylands

(Length of Growing Period in days/year)

75	120	180
arid	semi-arid	dry sub-humid

Other approaches utilise a more general working definition based on the idea of any area where rainfall is a problem owing to its amount, distribution and unreliability.² UNEP on the other hand, refers to a classification based on the aridity index³ (climatic perspective). It is important to note therefore, that the different approaches and classifications can produce very divergent assessments of the range and extent of drylands throughout the world. Nonetheless, there is no doubt that drylands are present in all the continents and cover more than a third of the Earth's land surface. Likewise, all the classifications agree that 90% of drylands areas have tropical climates.

These extreme climatic conditions strongly influence the **natural and socio-economic environments** of drylands. Ecosystems, including their flora and fauna, adapt their behaviour according to water availability and distribution. Seed germination and growth cycles for example, closely follow the variations in rain and moisture content in soils. Plants and wildlife developed mechanisms to survive long periods of both water and food scarcity. This adaptation process has been traditionally applied to human activities linked to natural resources management, such as agriculture and animal husbandry. Cropping patterns, farming systems, management of water resources, range management, harvest of wood and natural plants, wildlife hunting, food processing and storage have been relying traditionally on dryland agro-climatic conditions, turning the constraints of dryland natural diversity into an adapted social and economic diversity. Although the direct relationship between aridity and population density is still the object of debate, indigenous populations have often developed traditional social and economic systems that reflect the capacity of local ecosystems to provide the necessary nutrition, housing materials, shelter, energy and social welfare, which has led to inevitable consequences in terms of settlement patterns, population mobility, land tenure systems, nutrition patterns and rural livelihoods in general.⁴

1.3 AGRICULTURE AND LAND USES IN DRYLANDS

Despite extreme conditions agriculture and related land use have always played a leading role in drylands economies and societies. However, recurrent droughts and migration from rural areas have decreased the contribution of agriculture to the GDP of these areas and has accelerated many of the major changes (e.g. urbanisation and industrialisation) currently underway in many drylands areas. The development of **alternative economic options** remain however strictly dependant on the resource base, on the level of socio-economic development and on the capacity of the countries to create and maintain a diversified economic environment. The "poor drylands" are often the countries with strongest dependence on the primary production sector and at the same time are those facing the most serious threats in terms of sustainability of agriculture and land resource management.

² Hudson, 1987 – FAO Soils Bulletin 57

³ UNEP Aridity Index is defined as precipitation over potential evapotranspiration

⁴ M. Mortimore: Roots in the African dust, 1998

Constrained by limited water and soil resources, dryland rural economies have always been affected by strong competition between agriculture and other land resources uses. Optimisation of these limited resources is a high priority and often a matter of survival for the local populations and stock. The physical constraints tend to discourage reliance on single sources of food, income and wealth. Many indigenous societies in drylands areas have traditionally enhanced the multifunctional use of land resources: they have often adapted their production systems according to the availability and variability of the natural features, applying to some extent the concept of “carrying capacity”. An approach to **agriculture and land use that is “multifunctional in character” can therefore be considered a traditional response to dryland management**. Transhumance in the Maghreb, for example, is a traditional practice which regulates pressure on rangeland and enhances exchanges and trade between regions with different agro-climatic conditions and consequently favourable economic complementarity. Problems arise when increased pressure on land resources, often exacerbated in recent decades, disturbs the fragile balance, thereby jeopardising the natural capacity of the land to regenerate, leading to inevitable ecological, social and economic consequences.

The following table reviews the main dryland land use options in order 1) to define their main characteristics; 2) to assess the state of the resources they rely on and 3) to analyse the interactions, synergies and trade-offs that may enhance or deplete their potential to provide desired goods and services.

Table 2: Drylands land uses characteristics

<i>Drylands land uses main characteristics</i>	<i>State of resources and services</i>	<i>Interactions and multifunctionality</i>
<p>1. Food production</p> <p>Mainly produced by smallholding rainfed farming systems for local consumption and markets (often (semi)subsistence). Usually located close to water sources (rivers, wells, reservoirs). Crop species and varieties produced according to climatic and soil adaptability, availability of seeds and inputs, food habits and suitability to storage and processing. Often women’s duty to care for food gardens.</p>	<ul style="list-style-type: none"> Limited topsoil with poor organic matter, variable structure (from hard clay to sandy), often high salinity and exposed to wind erosion and run-off; poor and variable water availability, unless irrigation is provided; poor quantity and quality of services and inputs supply poor development of roads and infrastructures 	<ul style="list-style-type: none"> Competing on water resources with livestock, tree planting and domestic consumption. Benefiting from organic matter produced by livestock, shelter from trees (agroforestry) Providing food for households, goods for market, income opportunities
<p>2. Cash crops</p> <p>Their expansion is usually limited to irrigated areas and/or to species tolerant to high temperature, water stress and high salinity. They may include food crops for national and international markets (e.g. dates in oasis, tropical fruits) or industrial crops (e.g. cotton). Intensive farming may prove difficult with high inputs requirements and low yields. Smallholding units may prove profitable when food security is ensured and low inputs farming systems are developed.</p>	<ul style="list-style-type: none"> Arid soils are rapidly exhausted by intensive cropping and monoculture. Availability of rainfall or irrigation is a limiting factor. Surface irrigation may prove inefficient or even negative with high evaporation rates and potential increase of salinity pest infestations are more recurrent and damaging in intensive cropping with increasing control costs mechanisation is generally poor in most drylands developing countries 	<ul style="list-style-type: none"> Providing income generation opportunities for farmers competing with food crops and rangeland over land space and water resources (question of priorities) depending on storage, processing and transport capacity (commercial infrastructures) requiring higher capital investments and access to credit depending on market prices and economic fluctuations.

<p>3. Range farming</p> <p>Raising animals adapted to drylands conditions (sheep, goats, cattle, camels, ..) Extensive farming with high mobility of stocks according to seasonal rains, water sources and pasture. Stock health and productivity variable according to season and nutrition. Preferred 'multifunctional' animals (i.e. sheep for wool, meat and milk in semi-arid Patagonia)</p>	<ul style="list-style-type: none"> • Poor and variable edible vegetation coverage, with poor nutrition value in dry seasons and sensible to overgrazing ; • poor and variable quantity and quality of water • Mostly local animal species and varieties with low productivity but high adaptation to harsh conditions 	<ul style="list-style-type: none"> • Competing on water and land resources with agriculture and domestic consumption, • Providing food and income sources, as well as wealth and power to owners • Providing organic matter for soil and agriculture, and skins and materials for domestic uses. • Transport means (e.g. camels) • Influence social structure and habitats of pastoral communities (mobility, land tenure)
<p>4. Trees , woodlands and forests</p> <p>Forest vegetation is usually poor in drylands and mainly characterised by low density of species tolerant to water stress and to arid soil conditions. Composition and density depends on geophysical factors, on the proximity of water sources (oasis, rivers, valleys), and on variability and distribution of rainfall. Wood harvest for fuel and building materials is still very common in African drylands and in remote areas where no alternative is available. Tree population often represent an indicator of demographic pressure and land degradation. Tree plantation has been increasingly utilised for dune stabilisation and production of fodder around the settled areas.</p>	<p>In most drylands, forest and tree resources are common properties and the access and utilisation are regulated by traditional customs.</p>	<ul style="list-style-type: none"> • Trees and forests help to stabilise soil structure, organic nutrient content and water storage; • protect soil from wind erosion (in particular in sandy soils); • provide shelter and recreational areas for humans (social function) • provide firewood and domestic materials and tools (including clothes) for households; • create shelter and favourable ecosystems for wildlife and range farming; • provide wild fruits and plants for food and custom medicine uses • enhance crop productivity (agroforestry)
<p>5. Biodiversity conservation and management</p> <p>Nature conservation is often considered a land use option for countries having already ensured the basic development needs. It is thought by many as been incompatible with poverty and increased pressure on land. Nevertheless, conservation initiatives are widely spread in drylands areas, most often at the community level. Various forms of management can be found. National parks and reserves have been established in many dryland countries (Botswana, Kenya, Namibia, etc.) in order to exploit the economic benefits stemming from tourism. Restrictions often Their status often restricts agriculture, tree harvesting and other forms resource exploitation from within their borders.. In others protected areas (e.g. reserves), farming, hunting and harvesting can be regulated according to seasons, access rights or extraction quotas. There are successful examples of resource conservation managed by indigenous communities, applying the concept of "carrying capacity" and rotations.</p>	<ul style="list-style-type: none"> • Most dryland countries are experiencing increasing threats to their biological diversity. • Natural and/or human interference in natural ecosystems have brought many fauna and flora species to (the brink of) extinction. • Soil properties in natural habitats vary according to the vegetation coverage (forest, grassland, sand dunes, etc.) 	<p>Natural ecosystems :</p> <ul style="list-style-type: none"> • provide habitats for native flora and fauna • provide food, animal feed, medicine and materials for indigenous populations. • maintain and protect soil and water resources particularly important in upstream watersheds and in areas vulnerable to wind and water erosion. • represents a reservoir of genetic resources, important for agriculture and health. • help preserve natural landscape which is a valuable asset in terms of socio-cultural heritage and economic benefits from tourism.

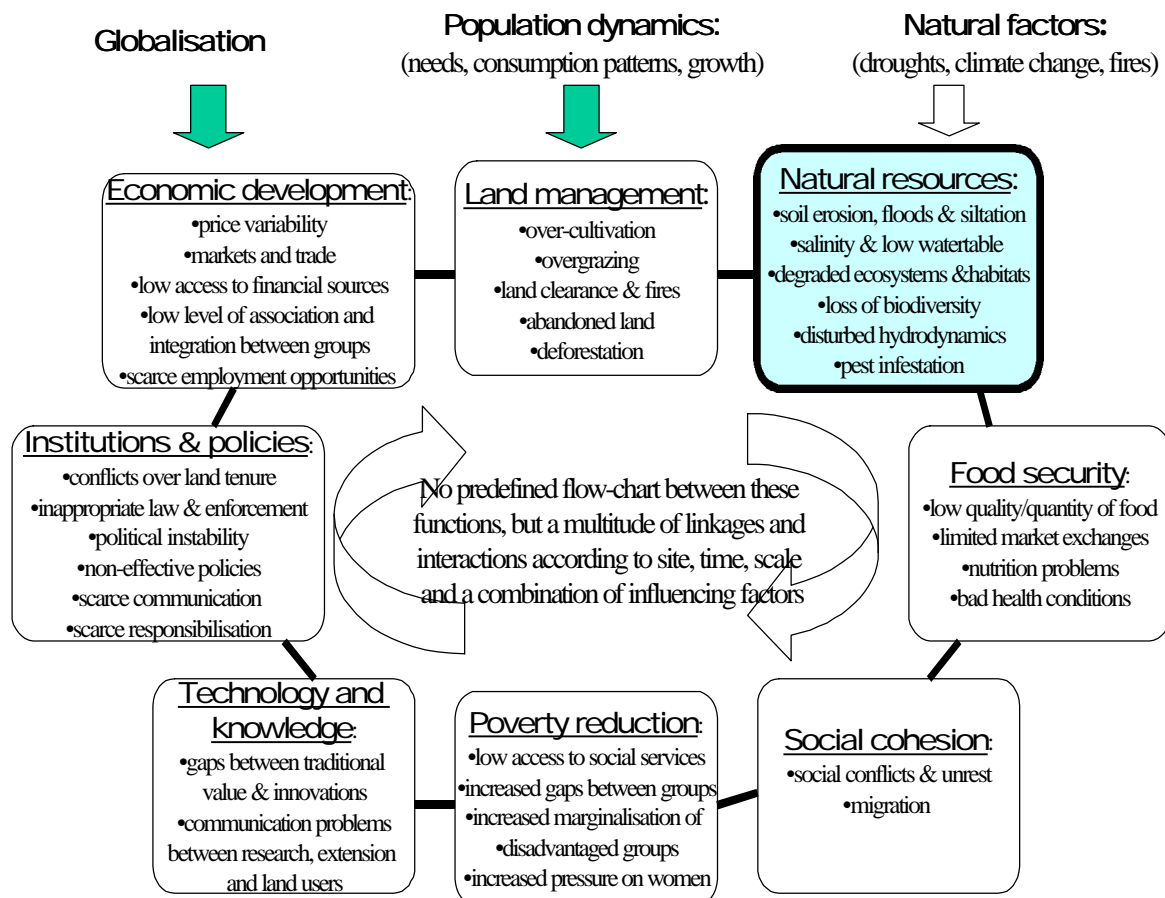
<p>6. Tourism</p> <p>Tourism is a growing industry world-wide and its role in some drylands is expanding according to the attractiveness of the countries. It can be based on natural features (e.g. national parks and safari tours in Eastern and Southern Africa, marine ecosystems in the Red Sea), on historical and cultural sites (e.g. Egypt, Syria, Yemen, ...), or on other services (e.g. shopping in UAE). It's a fast income generating activity, but tightly dependant on global changes (purchase power of tourists, competition, prices), on marketing and on the sustained or improved attractiveness of the sites.</p>	<p>The tourism has a various resource base according to its vocation and features, as indicated in the left column. Some of them are strictly related to the quality of land resources (including marine and coastal). Their preservation and enhancement is a condition for sustained tourism development.</p> <p>Other resources are related to the historical & cultural patrimony, which also need conservation and valorisation. The quality and variety of services is also a key for success (tourist accommodations, infrastructures, hospitality, etc.). Internal and external political and social conditions may also influence the attractiveness (e.g. Terrorism in Egypt recently provoked a serious tourism breakdown).</p>	<p>Tourism can generate a wide range of positive functions and impacts in the social, economical and natural environments.</p> <ul style="list-style-type: none"> • It generates income, job opportunities, infrastructures used also by the local population. • It provides marketing outlets for food production and for a variety of other local products such as handicrafts. • It enhances trade and communication with external partners. • It may stimulate preservation and valorisation of natural, cultural and historical features. <p>On the other hand, there is a growing awareness on the negative impacts than tourism can generate:</p> <ul style="list-style-type: none"> • on the environment (water consumption, pollution, pressure on habitats and ecosystems, etc.), • on the cultural values (breakdown and non-respect of traditional and religious customs, excessive monetarisation, etc.) • on the local societies (criminality, prostitution, increased gaps between stakeholders, conflicts on resource use, etc.) • on the economy (increase of prices, inequitable share of the benefits, etc.).
<p>7. Mineral extraction</p> <p>Fossil fuel and gas extraction is the economic backbone of several drylands countries in the Middle East and North Africa.</p> <p>Diamonds and gold are an important export commodity for the Southern Africa region and it is an interesting opportunity for others countries where prospecting just started.</p> <p>The resources have often a strategic role which may influence politics and the whole economy of the countries and regions.</p> <p>It can influence population dynamics with colonisation of regions and settlement expansion</p>	<p>Mineral resources are not renewable and their durability is variable, according to the resource base and to the level of extraction but is usually calculated in decades to make the preliminary investments profitable.</p> <p>The exploitation of other resources are also related to this sector. Land clearance, deforestation, food production, water management usually accompany the establishment of extraction sites.</p>	<p>Mineral extraction certainly had an important c impact on Arab countries generating income and investment opportunities, employment, trade and accelerating the major structural, social and economic changes in drylands society in a very short period of time.</p> <p>The financial resources allowed to colonise and exploit land resources for agriculture, food production, industry, urban development, infrastructure, tourism and services.</p> <p>The range and the distribution of benefits among the population and stakeholders is variable</p> <p>The potential negative impacts are also wide ranging and differently perceived by stakeholders and other actors; they include pollution, degraded landscape, breakdown of social and cultural traditions, political and social conflicts, etc.</p>

1.4 DESERTIFICATION: PROBLEMS AND RESPONSES

1. Identifying the Problem

All terrestrial life depends on the fragile, friable crust of soil that coats the continents. This precious covering is slow to form and can be destroyed extremely fast. The Worldwatch Institute has estimated for example, that 24 billions tons of topsoil are displaced or lost each year and that this process has accelerated over the last two decades.⁵ Land degradation may be defined as disruptive modifications and/or irreversible breakdown of land properties (including soil, water and vegetation) producing a serious threat to its capacity to provide goods and services. Land degradation occurs everywhere, but it is only defined “**desertification**” when it occurs in the drylands. More than 110 countries have drylands that are potentially at risk. The United Nations Environment Programme (UNEP) estimates that desertification costs the world \$42 billion a year in lost productivity. The **social cost** may be even higher and is certainly harder to quantify. Many dryland populations have been (or are in danger of being) driven from their land, increasing migration to urban areas and/or to other countries. Landless people and the breakdown of rural societies in affected areas contribute to poverty, social/ethnic conflicts, political instability, worsening also environmental degradation in abandoned lands and in overcrowded and disputed areas. The effects of

Figure 1 - Land degradation process in drylands
(according to MFCAL framework)



desertification are wide-ranging and deeply interdependent once the equilibrium is broken. A synthetic view of land degradation process as reflected in the CCD is given in Figure 1 below.

One of the reasons for examining desertification using an MFCAL approach is that the degradation of resources is well located within one function (natural resources) and can be evaluated against the other functions implicit in the MFCAL Approach. As a result, it is possible to argue that the figure in fact yields a more balanced representation of the desertification issue than conventional accounts, which tend to emphasise that desertification is the most significant phenomenon taking place in drylands. Instead, through privileging just *one* function, this type of approach inspire distorted interpretations that can, in some instance, generate mistrust among stakeholders and similarly, encourage strategies that reflect neither the needs nor the capacities of local communities or the natural resource base.

The **causes of desertification** have been extensively debated. A series of causes are most commonly identified: (a) overcultivation which exhausts the soils and the water resources, (b) overgrazing and (c) deforestation which remove the covering of vegetation, enhance soil erosion and accelerate depletion of soil fertility and nutrient content, and (d) poorly drained irrigation turning cropland salty.

These factors, mostly stemming from increased pressure on land resources and emphasised by disturbing natural phenomena (drought, climate changes, fires) are recognised as being closely linked to deeper underlying causes such as poverty, population dynamics, inadequate policies, planning and management of land, promotion and use of inappropriate technology and production systems, as well as economic and political factors (trade, marketing arrangements and debt) at local, national and global levels.

2. Describing the Responses

Both the debate surrounding the issue, and research on sustainable solutions have increasingly focussed on issues that may influence the trends and the decision-making process at their origin, rather than just addressing the symptoms when they occur. The aim of this shift has been to link responses to urgent needs in the context of long-term sustainability. The negotiations and the resolutions contained in the **United Nations Convention to Combat Desertification (CCD)** for example, have established a framework for a revised and integrated approach to the problem. The CCD, adopted in June 1994, is a legally binding agreement between the signatory partners. They all recognise that rehabilitation of degraded lands is a long-term process which requires a framework of policies and institutions ensuring the agreement and participation of all parties involved and in particular of the stakeholders directly concerned by the causes and the impacts of desertification: land users (farmers, pastoralists, foresters, ...), rural dwellers and community members (men, women, elders and youth) as well as all organisations, associations state agencies or private operators having a role in the use of land resources and in rural livelihoods. The actions foreseen in the framework of CCD usually comply with a set of agreed principles, which can be related to the MFCAL Approach, as discussed below.

⁵ The Centre for Our Common Future: Down to Earth, 1995

Table 3: CCD principles

CCD principles	Related MFCAL functions (*) : main functions
1. Understand the natural, social, cultural, economic and political features of the local and national environments in which actions are taking place, particularly their dynamics and interactions;	<ul style="list-style-type: none"> • Sciences, technology and knowledge (*) • Policies and institutions • Economic development
2. Integrate plans and actions into broader development policies, combining short term economic benefits with long term commitments;	<ul style="list-style-type: none"> • Policies and institutions (*) • economic development • management of land resources
3. Enhance the participation of the various categories of local people in decision-making process, with increased awareness of the issues at stake;	<ul style="list-style-type: none"> • Social cohesion (*) • Policies and institutions • Poverty reduction and equity • Science, technology and knowledge
4. Reinforce the control of local people over land resources (land tenure, access, benefits, etc.) and enhance the sense of ownership and responsibility;	<ul style="list-style-type: none"> • Social cohesion (*) • Management of land resources (*) • Policies and institutions • Poverty reduction and equity
5. Valorise traditional knowledge and good practices, where they show to favour resource conservation and to consolidate social cohesion;	<ul style="list-style-type: none"> • Social cohesion (*) • Science, technology and knowledge (*) • Environmental protection
6. Replace damaging practices with innovative solutions that may cope with local social and ecological peculiarities, and may prove simple to adopt and self-sustainable;	<ul style="list-style-type: none"> • Science, technology and knowledge (*) • Management of land resources (*) • Social cohesion • Environmental restoration
7. Improve the skills of the people and the capacity of the responsible institutions to identify and apply the technology options most appropriate to their specific environment;	<ul style="list-style-type: none"> • Science, technology and knowledge (*) • Policies and institutions • Social cohesion
8. Support the development of partnerships and co-operation on land resources management, in order to optimise the human resources available and minimise the risk of conflicts over land use options.	<ul style="list-style-type: none"> • Social cohesion (*) • Management of land resources (*) • Policies and institutions • Economic development

1.5 MFCAL CHALLENGES FOR DRYLANDS DEVELOPMENT

The debate on the impact of natural and anthropogenic causes of land degradation and the search for viable and sustainable solutions has led to a diverse range of approaches and development options. Accepting both that all of the main functions that fall under the MFCAL umbrella are both linked and inter-dependant and that land degradation is best understood in terms of systemic disequilibrium, one of the major challenge is to find and develop a new dynamic balance that both enhances self-regulatory factors and mitigates disruptive ones. Certainly the challenges differ according to different perspectives: between poor countries to rich countries, between farmers to the government level and between rural to urban areas, for example.. This diversity of perspectives and the interactions of decisions at all levels make prioritisation an essential step in formulating policies and strategies and in selecting those actions that most likely will generate positive results. To do so each one of the functions addressed by the MFCAL approach, should be explored both individually and in

combination with the other functions in order to identify both the specific challenges contained in any given context, and likewise, the most appropriate and sustainable strategy or solution for the given drylands area.

Table 4: Strategies for drylands development

<i>MFCAL objective / challenge</i>	<i>Examples of strategies & actions in drylands</i>
a) Ensure food security	<ul style="list-style-type: none"> • increase resilience and productivity of farming systems (agroforestry, input supply, integrated pest management, recycling of organic materials, water harvesting. • promote and develop food diversification opportunities • integrate food production with storage, marketing and distribution facilities • improve nutrition patterns • provide food producers (farmers, women) with appropriate support and services • enhance co-operation and association among producers
b) Strengthen policies and institutions	<ul style="list-style-type: none"> • Regulate land tenure and access to land resources • Create co-ordination and consultation mechanisms between various sectors of the economy and of the society (wider participation in decision-making process) • Develop mechanisms to increase and regulate agricultural prices, to access to low interest microcredit, to protect local markets • Harmonise national legislation, standards and regulations with international commitments, conventions and global mechanisms • Improve legislation and fiscal environment
c) Improve the economic environment	<ul style="list-style-type: none"> • create employment and income opportunities for land users and in particular for disadvantaged groups • organise/stabilise economic driving forces and groups of interest dealing with the agricultural sector and with rural areas
d) Alleviate poverty	<ul style="list-style-type: none"> • improve living conditions, health, wealth, education and status of disadvantaged people (women, youth, indigenous communities, etc.) • improve rural and urban livelihoods • mitigate migration from rural areas and the effects of urbanisation
e) improve social cohesion	<ul style="list-style-type: none"> • improve local governance and empowerment of local communities • promote participatory approaches to decision-making process • stabilise land tenure systems and rights of disadvantaged groups over land use • valorisation of cultural patrimony • increase/improve social services (health, education, recreational, ...) and economic opportunities
f) Protect/restore land resources	<ul style="list-style-type: none"> • regenerate soil productivity (fertilisation, erosion control, salinity control, revegetation, etc.), • preserve/rehabilitate ecosystems and natural habitats • watershed protection and management

	<ul style="list-style-type: none"> • integrated coastal area management • protect and rehabilitate bio- and agro-diversity and genetic resources • create job opportunities with conservation measures • energy optimisation for households (replacement of fuelwood with alternative products) • recycle of waste waters and by-products
g) Improve knowledge, technology	<ul style="list-style-type: none"> • Improve research-extension-farmers linkages and co-operation • integrate traditional knowledge with innovative technology • improve stakeholders participation in extension, training, awareness and education programmes (e.g. gender, youth, indigenous communities)
h) land resource management	<ul style="list-style-type: none"> • Promote land use practices for food security, for low impact, economic return and conservation of resources • Zoning and land use planning • Integrate physical development and resource conservation • Prevent, monitor and control population dynamics and external pressures on land resource management

Whatever level of intervention is considered, from local to global, and whatever objective is targeted, the issues must be tackled in an integrated manner in order to maximise both synergies and positive trade-offs between functions. Similarly, the range of possible strategies and actions as listed above should encourage solutions that are sensitive to place, time and scale.

A recent review of lessons learnt in the Sahel region undertaken by UNSO/Asdi, provides a clear example of this type of approach. The report recommends a strategy that includes the following actions:

- Participation of populations, NGOs and national institutions (function e)
- Implementation of low cost techniques based on local knowledge and providing rapid additional economic income (functions h, e)
- Access to education and microcredit (functions b, d)
- Revision of legislation on natural resources management (function b)
- Increasing the direct responsibility of land users (functions e, d)
- Capitalisation of experiences and successful technical solutions (function g)
- Promotion of pilot catalytic activities (function c)

The case study assessments undertaken in the following section allow for a more comprehensive assessment of the utility of the MFCAL Approach as a tool for identifying sustainable strategies and options for drylands areas.

2. THE ASSESSMENT OF CASE STUDIES

2.1 PRESENTATION OF CASE STUDIES

2.1.1 Selection and assessment criteria

a) The MCS Database

The preparatory process of the *FAO/Netherlands Conference on the Multifunctional Character of Agriculture and Land* included the global distribution of the “Stock-Taking Case Study Questionnaire”. The questionnaire was based on the same broad interpretive criteria outlined at the start of this paper and explored various aspects of case studies that highlighted the multifunctional character of agriculture and land. The results were incorporated into the “MCS Database”, containing information on over 170 separate case studies from throughout the world and ranging from highly localised activities to global initiatives.

Many of the case studies examined in the following sections are drawn from the MCS Database. They were identified following a multi-stage selection process. Firstly, case studies were grouped according to agro-ecological zone. Approximately 50 case studies referred to “arid and semi-arid” zones. Of these, 30 were selected. Final selection was based on the following criteria:

- relating mainly or exclusively to drylands;
- representing a wide range of dryland situations world-wide (geographic and cultural distribution criteria);
- representing a wide range of development scenarios (from least developed countries to industrialised countries);
- representing a wide range of farming systems and land use options.

Based on the information given in the questionnaires, the case studies were individually assessed according to their relevance to the MFCAL approach. An assessment sheet was produced for every case study, including information on:

- basic information such as title, location, type of implementing body, production system, scale of intervention and objectives of the action(s), in order to characterise the case study and ease the assessment process and the identification of relevant typologies;
- a table indicating the results of the case studies on the main functions, as well as the most influential factors for success or failure, in order to interpret the multifunctional character of individual case study examples and to assess the contribution to sustainable agriculture and land use in the selected drylands areas.

The **first set of replies** reflected what respondents considered to be the most outstanding achievements or the most significant contributions to sustainable agriculture and land use management of the individual case studies. Obviously, it is important to remember that the persons filling the questionnaires are usually those responsible for the implementation, management and/or supervision of the said project or persons directly involved or concerned by the project outputs. The primary results could eventually be considered as the most immediate, the most visible or the most verifiable. It usually correspond to the specific project targets.

The **second set of replies** also referred to achievements, but differed from the first set of answers in that :

- they are not immediately visible or verifiable;
- they correspond to long term objectives;
- they are indirect achievements not specifically targeted at the beginning of the project;
- they result from a combination of internal and external factors/actions.

The **most influential factor identified** to either:

- factors *contributing to the successful impact* of the action, ensuring its replicability and/or sustainability; they may include specific approaches (e.g. stakeholders participation) or technologies (e.g. use of natural wind breaks) used by the project, as well as actions or conditions not directly influenced by the project (e.g. stability of prices, favourable climate);
- factors *limiting the successful results* of the project or jeopardising its long term benefits; they may include unpredictable factors (e.g. political instability, drought, etc.), non-compliance with previous commitments from a key partner (e.g. cancelled funds/credit), changed priorities and support. Their identification and analysis can, if timely made, re-orientate the project or learn from it for future initiatives.

b) by IFAD

The second set of case studies used in this study were derived from the IFAD project database. The database referred to some 530 projects. It was decided that the most effective way of assessing their relevance to this study was to examine the project evaluation reports. These contain critical assessments of what the results and the impact of projects have been (or are), and differentiate between expectations and reality. Using similar criteria to those employed in selecting case studies from the MCS Database, a total of 60 IFAD projects were initially selected. Detailed assessments were undertaken of the 21 most relevant examples. It must be recognised, however, that the evaluation reports were prepared without any specific reference to the MFCAL Approach, unlike the case studies contained in the MCS Database. As a result, many of the examples selected from the IFAD project database do not address the precise elements and details invoked by the MFCAL approach. Nonetheless, the value and relevance of many of the case studies selected is amply demonstrated in the following sections.

The most important criteria for projects to be considered were the availability of evaluation reports and its location in dryland. Evaluation information was available either in hard copies of reports or on CD-ROM (executive summaries). Such information covered a total of 175 projects, or one-third of the total body of IFAD projects. This information indicated quite often that a project was a dryland project, or the opposite, a humid agriculture project. The geographical distribution of drylands as given by the UNEP World Atlas of desertification enabled the selection of further dryland projects. Projects that clearly were not dealing with multifunctional agriculture, such as fisheries and credit for non-agricultural use, were disregarded. The resulting list counts some 60 projects, over ten percent of the total body of IFAD projects. Out of these, 21 were selected and individual assessment sheets prepared, following the same criteria as the 'FAO' ones, giving preference to projects with a late closing date. The latter was done under the assumption that more recent projects would be more multifunctional than older, or 'traditional' ones.

2.1.2 General overview of selected case studies

A total of 51 case studies were selected from the MCS Database and the IFAD project database and constitute the empirical universe of the following analysis. The geographical distribution of the selected case studies is indicated below:

Region	N.	Countries
Sub-Saharan Africa	20	Kenya, Senegal, Mozambique, Mali, Burkina Faso, Zimbabwe, Cape Verde, Ethiopia, Sudan, Tanzania, Chad, Botswana, Niger
Latin America & Caribbean	9	Haiti, Venezuela, Peru, Argentina, Ecuador, Bolivia, Mexico, Brazil
Asia	7	India, Pakistan, Indonesia
Near East	6	Iran, Turkey, Lebanon, Yemen
North Africa	5	Morocco, Egypt, Tunisia
Pacific	3	Australia
North America	1	USA

The case studies involve various production systems and land use patterns and are carried out under the responsibility of different types of implementing agencies, as shown below.

Production system	Cases
Smallholder rainfed farming	23
Smallholder irrigated farming	17
Specialised farming	5
Rangefarming – livestock	5
Organic and low input agriculture	5
Forestry and agroforestry	3
Nature conservation	1
Post-harvest, processing and marketing	1
Renewable/alternative energy production	1

Type of implementing agency	Cases
Governmental agency	22
Inter-governmental agency	11
NGO	5
People's organisation	4
Private sector	4
Research institute	4
University	3

The cumulative result of the individual case study assessment sheets can already give some interesting response, as show in the following table (highest rankings in each column are highlighted in bold).

Table 5: Overview of case studies

MFCAL main functions	Primary results		Secondary results		Success and/or limiting factors	
	MCS	IFAD	MCS	IFAD	MCS	IFAD
1. Food security	17	20	12	3	3	16
2. Policies & Institutions	8	11	13	5	18	16
3. Economic development	13	16	13	4	11	16
4. Poverty reduction and equity	6	11	19	2	8	5
5. Social cohesion	5	15	16	6	14	14

6. Environmental restoration, protection and enhancement	19	11	24	2	6	15
7. Science, technology and knowledge	9	3	13	0	20	8
8. Management of land resources	11	8	19	0	7	4

2.2 ANALYSIS OF CASE STUDIES

Although the selection criteria sought to make the sample as representative as possible, it is perhaps necessary to offer a few preliminary observations. The IFAD case studies are all projects financed by IFAD whereas the case studies contained in the MCS Database are diverse in nature and type and do not depend on a single common source of finance. Similarly, the MCS Database contains “success stories” that were submitted by respondents following a specific request. The IFAD case studies have been selected post factually from the general IFAD project database and their assessment is based on evaluation reports and not directly on the framework used in the MCS questionnaire.

An initial review of the previous table indicates that the two sets of case studies show a different statistical distribution of results and driving factors. This can be explained in part perhaps, by IFADs mandate which is strongly focused on food security and the socio-economic development of rural areas. The case studies selected clearly reflect these priorities.

The MCS Database case studies embody a wider and more diverse range of situations, as regards implementing bodies, financing sources and geographical distribution. Two types of projects emerge from the MCS group:

- the “**socio-economic**” oriented projects, whose main objectives relate to ensure food security and the development of improved social and economic conditions for local land users and populations (*human-driven approach*);
- the “**environmental and land management**” oriented projects whose main objectives concern the reversal of land degradation, the preservation of the natural capital of land resources (water, soil, bio-diversity *etc.*) and to the development of environmentally sound land management systems (*resource-driven approach*).

The IFAD group of case studies fall mostly under the first category with food security, economic development and social cohesion as the top ranking functions. In order to facilitate analysis, these two “types” are used in the assessments contained below.

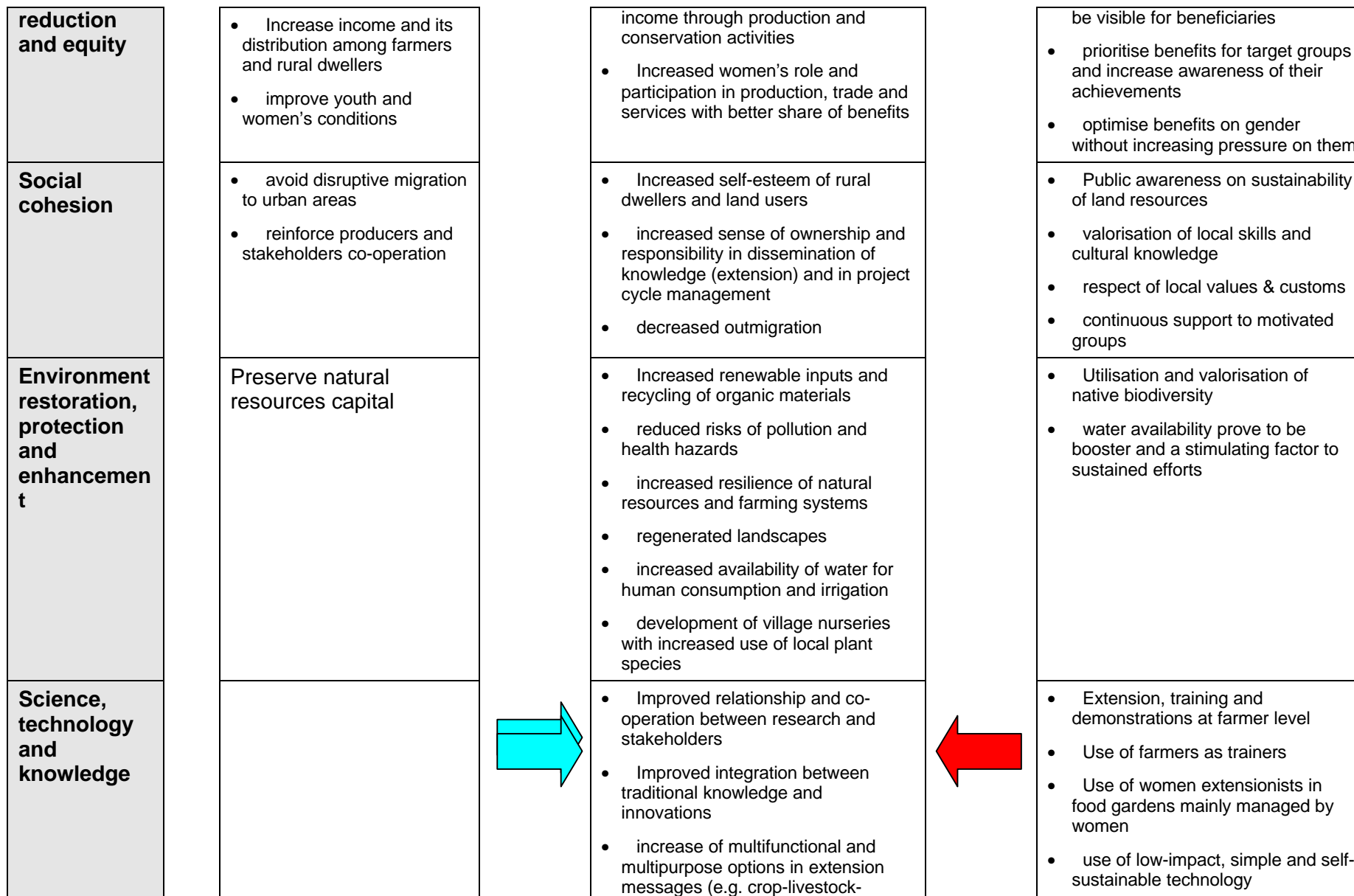
Although they represent different, sometimes opposite viewpoints and attitudes, the two types are complementary. The cumulative response of the case studies falling under the two typologies is reported in the Tables 6 and 7 below. The tables highlight the interactions between project objectives (the targets) and the outcomes, outlining the most influential factors (conditions) ensuring or undermining their successful impact. One should bear in mind that these tables give an overview of many factors that are related to the MFCAL approach. A range of general conclusions emerge from Tables 6 and 7:

- i. The **objectives** usually represent the **priority** issue at stake, as perceived by the project promoters and/or by the responsible institution.

- ii. The **results** generally fall under a wider range of issues and not automatically under the same MFCAL function as the objectives. Not all the results are visible and measurable at the same time or at the same scale, because in an evaluation process short-term impacts are often combined with long-term effects. The results are tightly related to the approach applied in the projects and to the type of actions carried out (technical, financial, organisational, etc.).
- iii. The **actions** (as described in the available documents) do not automatically reflect the issues outlined in the objective and the case studies show an interesting diversity of initiatives. This means that after defining the objectives (priority targets) the project developers feel necessary (and decide) to intervene in a wider range of issues. During the project cycle the external factors recognised as influential may also become themselves part of the project interventions, in order to consolidate the project outputs and to control, monitor and/or influence eventual factors that may affect the project viability and sustainability.
- iv. The **conditions for success** can either be
- a *socially acceptable approach* (e.g. community participation, presence of local facilitators, respect of traditional customs and hierarchy, ...),
 - a *technically or ecologically appropriate technology* (e.g. recycled fuel bricks as alternative to natural firewood, replanting of more adaptable and multipurpose indigenous plant species), or
 - an *economically viable instrument* (e.g. availability of credit and market facilities).

Table 6 : “Socio-economic” oriented projects

MFCAL	Objectives	Results	Conditions for success
Food security	<ul style="list-style-type: none"> • Increase food production • Improve food security 	<ul style="list-style-type: none"> • Diversified and improved reliability of food sources • Improved access and availability of farm inputs (seeds, fodder, etc.) • Improved nutrition and health conditions for households 	<ul style="list-style-type: none"> • Understanding the relationships between stakeholders upstream and downstream. • flexibility of implementation measures in relation to beneficiaries needs
Policies & Institutions	<ul style="list-style-type: none"> • Reduce conflicts over land use • strengthen institutional capacity and coherence 	<ul style="list-style-type: none"> • Creation of producers associations • Alliance between producers and consumers associations • Broad rural development vision and participatory approach integrated in institutional staff capacity • Establishment of monitoring & evaluation systems • Development of land tenure management systems 	<ul style="list-style-type: none"> • Communication and consultation between institutions and stakeholders • Community agreements on land tenure and land use options
Economic development	<ul style="list-style-type: none"> • Improve trade balance with imports substitution production 	<ul style="list-style-type: none"> • Creation of new job opportunities • increased profitability of farming systems • Added-value of marketed goods • decreased dependence from external inputs • Improved rural infrastructure • enhanced rural entrepreneurship • improved performance of micro-credit 	<ul style="list-style-type: none"> • Availability of credits , inputs, markets and transport • credit facilities and services targeted to disadvantaged groups • development of effective non-far opportunities to complement limited agricultural base • integrate socio-economic surveys within development research
Poverty	<ul style="list-style-type: none"> • Stabilise rural livelihoods 	<ul style="list-style-type: none"> • Increased and reliable sources of 	<ul style="list-style-type: none"> • economic and social benefits must



		<p>forestry)</p> <ul style="list-style-type: none"> • valorisation of existing technology and knowledge 	<ul style="list-style-type: none"> • adapt extension and innovations to local needs, level of skills and capacity of follow-up through farm tests and pilot schemes.
<p>Management of land resources</p>		<ul style="list-style-type: none"> • Increased cropping period with irrigation and integrated farming systems • Improved soil properties (structure, water retention, fertility, organic content) by erosion control works, water management, recycling of organic matter • Reduced erosion and land degradation in general • improve productivity of grazing land through zoning and rotation 	<ul style="list-style-type: none"> • Considering food crop, rangeland and forest resources as an integrated cycle (enhanced synergies) at farm and regional levels

Table 7: “Environmental and land management” oriented projects

MFCAL	Objectives	Results	Conditions for success
Food security		<ul style="list-style-type: none"> Improved diversity of food and income sources 	
Policies & Institutions			<ul style="list-style-type: none"> respect of traditional land tenure systems community agreement on land use options coherence of policies, price agreements and public services
Economic development		<ul style="list-style-type: none"> New market opportunities for organic products and alternative fuel sources 	<ul style="list-style-type: none"> conservation activities must be potentially income-generating importance of marketing and infrastructure for development of “niche markets” for clean products
Poverty reduction and equity	<ul style="list-style-type: none"> Enhance the social and economic benefits from use of land resources 	<ul style="list-style-type: none"> improved stability and wealth of disadvantaged groups reduced migration and social conflicts 	
Social cohesion		<ul style="list-style-type: none"> Improved sense of ownership and responsibility over land uses 	<ul style="list-style-type: none"> awareness among rural dwellers and practitioners gender considerations
Environment restoration,	<ul style="list-style-type: none"> Restore and enhance natural capital of land resources (water, soil, 	<ul style="list-style-type: none"> Reduced impact of chemical inputs and pollution hazards 	<ul style="list-style-type: none"> Use of native plant species for multipurpose uses (wind breaks, water retention, shelter, nutrition,

<p>protection and enhancement</p>	<p>biodiversity)</p>	<ul style="list-style-type: none"> • effective reduction of natural wood harvest • Improved availability of water resources with increased resilience of farming systems • controlled pest and weed infestation 	<p>wildlife conservation, etc.)</p>
<p>Science, technology and knowledge</p>			<ul style="list-style-type: none"> • Successful farmer-to-farmer extension and training approach
<p>Management of land resources</p>	<ul style="list-style-type: none"> • Reverse the rate of land degradation • develop sustainable land use options 	<ul style="list-style-type: none"> • regenerated soil properties and productivity • reduced impact of natural disasters and climatic phenomena 	

Assessment of the two sets of case studies reveals the following patterns and trends:

a) “socio-economic” oriented projects (Table 6)

- **Objectives** are defined on issues related to the quality of livelihoods in concerned areas and to the activities ensuring the appropriate social and economic conditions for the households: food security, nutrition, employment and income stability, conflict management and poverty alleviation.
- **Actions and investments** are mostly directed at addressing the productivity of the resources and the viability of the activities on which the populations rely on for their wealth (and sometimes for their survival). Within the actions described in the case studies, many include the preservation, rehabilitation and sustainable management of the limited resources (water, soil, vegetation) and the optimisation of these resources for added-value outputs (irrigation, aquaculture, agroforestry, integrated farming and rangeland, etc.). These “physical” interventions are generally accompanied by planning activities (e.g. land use plan), development of human resources (training & extension), establishment of appropriate institutional and legal framework (decentralisation, empowerment of stakeholders, price regulations, norms and standards, etc.), and provision of economic incentives to stimulate stakeholders initiatives.
- **Conditions for success** include:
 - “*Policies & Institutions*”: participation and bottom-up approach, conflict resolution over land tenure and land use options;
 - “*Science, Technology and Knowledge*”: use of appropriate technology, delivery of training and extension services at farmer level, integration of innovative techniques with local knowledge and customs;

BOX 1: EXAMPLE OF A “SOCIO-ECONOMIC” ORIENTED PROJECT

THE COTAGAITA – SAN JUAN DEL ORO AGRICULTURAL DEVELOPMENT PROJECT IN BOLIVIA

The *project area* covers 20 000 km², with approximately 50% in agricultural use. It includes deep valleys (3 000 m + MSL) with irrigated agriculture, and high Andean plains (over 4 000 m + MSL) with rainfed agriculture. It caters for 130 000 people (1984). One road, leading into Argentina, crosses the otherwise isolated area. The target group consists of 10 500 households, having farms of 1.5 hectare. Main objective of the project was to increase income and living standard of the rural population. Via its further formulation it is related to 6 (out of 8) functions: Food security, Policies and institutions, Economic development, Poverty reduction and equity, Social cohesion and Environmental restoration etc. The evaluation report carries *messages* that illustrate the cross fertilisation of activities in several domains; these have been analysed briefly below through a multifunctional framework.

- i) Construction of new roads led to reduction of transport costs (Economic development), and also to introduction of new crops (Food security). As a consequence, the area became integrated into the national economy (Policies and institutions).
- ii) Project interventions in different domains, viz. provision of drinking water and sanitation (Environmental restoration etc.), new lands out of land rehabilitation (Management of land resources), and the extension services proper (Science, technology and knowledge) led to increased agricultural productivity. In turn, that productivity led directly to better nutrition of the rural population concerned and hence its food security (Food security), and indirectly via marketing of produce (Economic development) and generated income (Poverty reduction and equity) again to food security (Food security).

- iii) Beneficiaries's involvement during the project's planning and its adaptations during implementation (Policies and institutions), construction and maintenance of infrastructure (Economic development), and implementation of other componenets created an enhanced form of social organization (Social cohesion).
- iv) People consider their village area as a strategic base where to raise a family, but will continue to migrate, the resource base of the area not being sufficient to meet their needs and expectations (Multifunctionality as such; peope realize that they have a shared interest (Social cohesion) in improving the stnadard of living in their area (Food security).
- v) The limited success of credit (Economic development) did not prevent people from becoming engaged in activites that would increase their incomes (Poverty reduction and equity); apparently such activities were attractive to people even without credit.

- "*Food security*" is often considered a condition *sine qua non* for addressing economic and environmental issues
- "*Economic development*": a suitable economic environment and the availability of appropriate economic instruments (credits, markets, incentives) are instrumental for achieving food security and to stabilising rural livelihoods;
- "*Social cohesion*": the wide participation of stakeholders in the development and in the decision-making process are particularly stressed in the case studies.

- **Results** are wide ranging and refer to many of the functions addressed in the MFCAL approach. It is however, interesting to note that they often not directly related to the objectives nor to the actions, but to a combination of factors and driving forces. These driving forces do not necessarily imply additional investments. Instead, they tend to be local factors and forces that influence the unfolding of activites in such a way as to make them more responsve and sensitive to local conditions and needs but also, and perhaps most importantly, to broaden the range of indirect effects and benefits.

b) "Environmental and land management" oriented projects (Table 7) :

- **Objectives** are targeting the state of the resources (level of degradation), their capacity to produce the expected benefits (productivity) and the practices that may regulate the increasing pressure (farming systems, input supply, technology, etc.).
- **Actions** are aimed at restoring or developing a sustainable balance between exploitation and resource conservation. Together with the physical intervention already described in the previous project typology (soil protection, water management, revegetation, etc.), great emphasis is given to understand the natural and socio-economic features of the environment in which action is taking place by applying the concepts of "Carrying Capacity" and "Environmental Impact Assessment". The actions are also considering economic and social measures to create favourable conditions for the adoption and acceptance of environmentally-sound practices.
- **Conditions for success** : "*Science, Technology and Knowledge*" is the most recurrent topic (root-based extension and training services, transfer from farmer to farmer, valorisation of local know-how, etc.), followed by "*Policies & Institutions*" (respect of local land tenure, community agreement on land use options, coherence of policies, price and public services).

-

Box 2: Example of a “environmental & land management” oriented project

(referred to case study N. 27)

The project is located in Mali rural area, with a typically dryland ecosystem, characterised by extensive tree resources, grazing land and rainfed agriculture. Energy consumption is traditionally based on firewood which is harvested mainly by women. The increased rate of wood harvest for domestic consumption has become a serious threat to the renewal on wood resources, jeopardising the capacity of natural ecosystems and farming systems to regenerate and to provide the necessary energy source for households. This leads to increased workload and cost for rural dwellers, particularly women, to find wood for their needs and to a decreased productivity of land resources for food production and other rural activities.

The objective of the project was to develop and disseminate a viable and acceptable alternative to firewood and to decrease the rate of deforestation and land degradation (**Environmental restoration**).

Alternative fuel sources have been tested by a private venture using agricultural wastes and by-products (**Technology**). A fuel brick has been produced on a semi-industrial scale and combined with improved ovens, has been promoted and sold in rural areas (**Economic development**). The marketing campaign addressed women and their daily household needs (**poverty reduction**), demonstrating the cost-effectiveness of the proposed option. The results have rapidly spread in the targeted villages and region. To respond to an increasing demand, the distribution and the commercialisation (**food security**) was ensured through the creation of a network of self-employed distributors and retailers (**social cohesion**), enhancing entrepreneurship and equal share of economic benefits all along the circuit (**Equity**). The benefits are visible on households economies, on employment, on the reduction of wood harvest and equivalent protected woodland (**Environmental protection**).

The major key of success are the wide spread economic and social benefits (**Economic development and poverty reduction**) and the targeting of appropriate groups such as women (**Equity**) and their specific needs.

This case shows how a combination of economic and social actions with the use of an appropriate technology helped solving an environmental problem, but at the same time it shows that stakeholders learn through effective experiences that the quality of their livelihood depends on the health of the resources they rely on. This case is also a positive example of optimisation of scarce resources where recycling of available wastes and simple household tools can be an effective and accepted solution to unsustainable consumption patterns.

The sustainability of the project is ensured by the degree of acceptability among the population and by the fact that the innovation has rapidly and without disturbance integrated the household customs.

- **Results:** the same indications as noted in point a) above.

The assessment process also involved examination of 1) the relationship between the two types of case studies and the geographic distribution (by regions), 2) the type of production system and 3) the type of implementing body. The following patterns and trends emerged:

- **Geographic distribution:** In Sub-Saharan Africa, the resource-driven approach is applied in 8 projects out of 9 of the MCS group; strong emphasis is given to sustainable land use and to regeneration of degraded land, which is seen as the primary objective and the necessary step to (re)generate social and economic development and wealth. In other regions, the limited number of case studies do not show major preferences in applying one of the said approaches.
- **Production system:** The resource-driven approach is applied in all the specialised farming situations, where land degradation (lost fertility, excessive salinity, low nutrition content, pest infestation, etc.) is considered a consequence of unsustainable

intensive farming. The potential and/or effective solutions include low input farming, organic farming, integrated/biological pest management, minimum tillage, rotations, agroforestry, appropriate irrigation, etc. The economic and social benefits come from reduced costs, decreased dependence on external inputs and reduced health hazards. In other production systems, no preference is specifically recorded.

- **Implementing bodies:** Private sector developers emphasise, in the 4 considered case studies, the environmental state of the resources and the long term productivity of land as a necessary condition for sustained economic viability of the farming systems and land use patterns. The other types of implementing agencies are equally sharing the resource-driven and the human-driven approaches.

2.3 LESSONS LEARNT FROM CASE STUDY ASSESSMENT

All the selected case studies deal with drylands and areas affected by desertification. Although they represent different ecological, cultural and socio-economic environments, their overall common objective is to create favourable socio-economic conditions and sustainable relationship between land resources and their related activities. To do so they have to address the effects and/or the causes of land degradation. Valuable lessons emerge from these field experiences. The following can be mentioned:

- a) Within the wide range of problems affecting the concerned areas, the project objective is usually formulated according to what is perceived as a **priority issue**. All the case studies stress the importance of undertaking the **targeting, prioritisation and planning** process with the stakeholders and potential beneficiaries. This is often mentioned as a condition for success because it increases the acceptability of the project, the sense of ownership and responsibility of land users and local populations and the awareness of the issues at stake.
- b) Independently of the chosen objective (social, economic or environmental), the successful case studies have always tackled a wider range of issues, some of them directly by investing time and resources, and others indirectly by considering the influential external factors and adapting their approach and actions accordingly. In this context, the multifunctional character of agriculture and land emerges in the combination of actions and driving forces, in the **flexibility** of the approach and in the diversity of the implementation measures.
- c) The case studies show that the actions do not necessarily fall under the same categories as the objective. It's advisable to **define the actions** as a combination of technical, social or economic actions which helps consolidating the results and enlarging the range of benefits.
- d) The most recurrent conditions for success are found in the MFCAL topics of "Policies & Institutions", "Science, Technology & Knowledge" and "Social cohesion". Some of these issues are often much greater than the scale of intervention of the single projects. The **coherence** of policies, regulations, training & extension or technology with the peculiarities of the social and natural environment is therefore very important and influential. **Participatory approach, decentralisation** of responsibilities are often mentioned as essential methods to ensure coherence and acceptability of actions. Supported by information management and appropriate communication, they can reduce conflicts and enhance co-operation among/between stakeholders and institutions

3. THE MFCAL APPROACH AND DRYLANDS DEVELOPMENT: LOOKING TO THE FUTURE

Drylands are characterised by limited, fragile and variable land resources. Optimisation of these resources is a priority issue for those land users and populations that dependant on them for their livelihoods. Increased pressure from various sources is seriously jeopardising the capacity of drylands to provide the necessary conditions for a sustainable social and economic development.

The MFCAL approach provides an analytical framework for considering a wide range of issues relating to agriculture and land management. The relevance of the approach for the study of drylands has been demonstrated through the assessment of a series of case studies which integrate human-driven and the resource-driven perspectives. Successful initiatives to combat desertification enhance the multifunctional character of agriculture and land and in particular the results and impacts.

The case study assessments demonstrates the strong linkages and assessments between the elements of the MFCAL approach and the issues raised in the examination of drylands. The optimisation of resources, as mentioned above, is strongly dependant for example, on the range of functions (goods and services) that these limited resources can generate.

The MFCAL approach can be applied to both the micro (or project) level and the macro (or policy) levels.

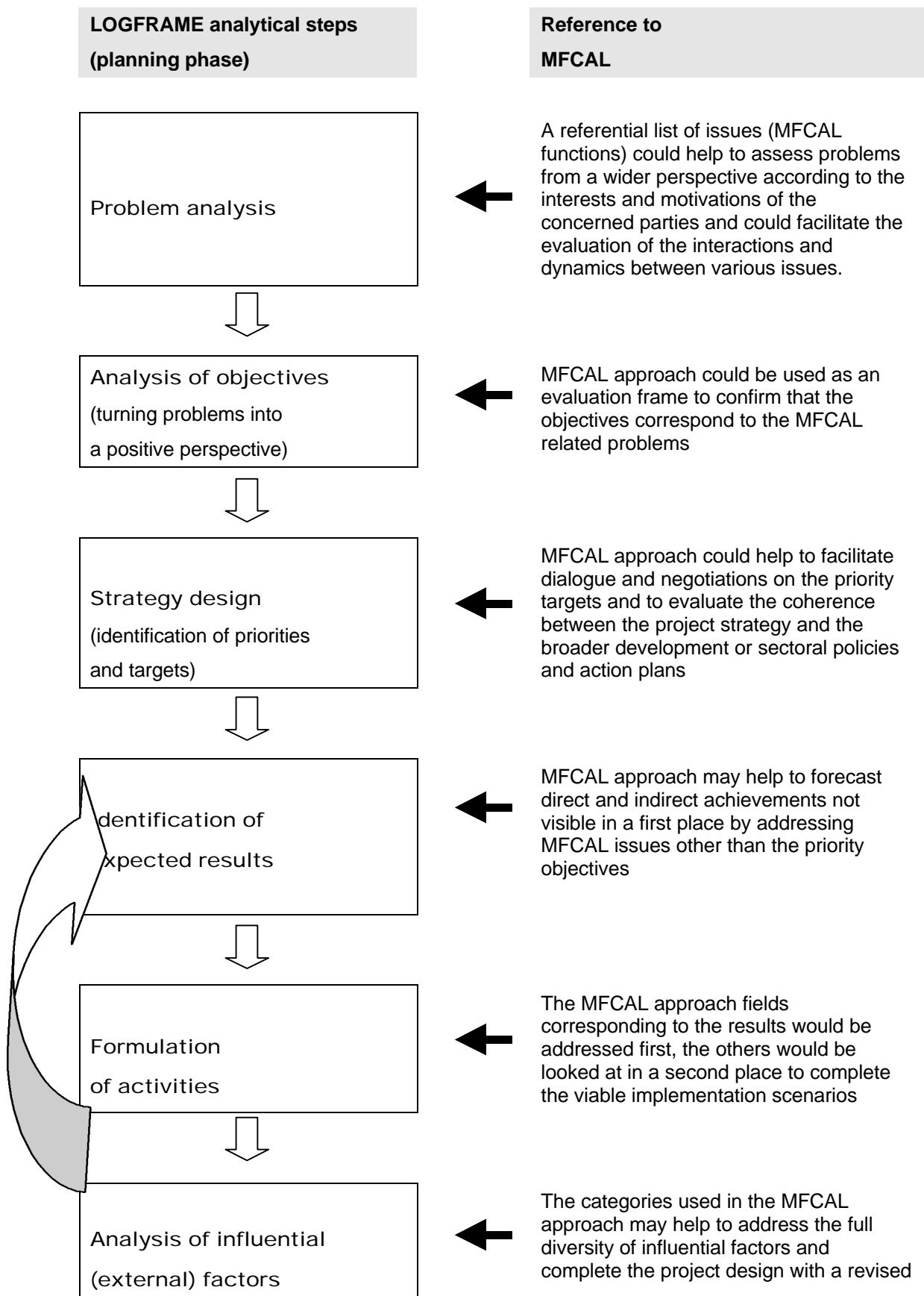
3.1 PROJECT MANAGEMENT LEVEL

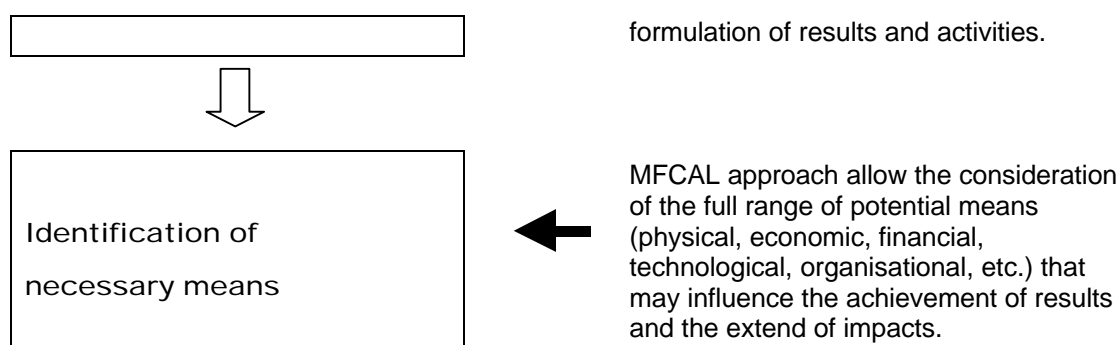
How can the MFCAL approach improve project cycle management in drylands?

There has been an increasing effort by development actors world-wide to standardise methodologies and procedures concerning development initiatives with a view to increase their performance and to create a common ground for discussion, exchange of experience and evaluation.

Development agencies world-wide adopted nowadays a common project cycle management methodology called Integrated Approach and Logical Framework. The Integrated Approach and Logical Framework, called LOGFRAME hereafter, is a project management tool applied all along the project cycle, from indicative programming to ex-post evaluation passing through project appraisal, formulation, implementation and monitoring. It comprises different analytical steps as outlined in the following diagram, in which the MFCAL approach can demonstrate its relevance and utility throughout the process.

Figure 2: MFCAL inputs to LOGFRAME





3.2 MACROECONOMIC AND POLICY LEVEL

The case study assessment exercise showed that whatever objective, strategy or approach is chosen, the effective results and impacts are often dependant on a wide range of driving forces and influencing factors which control is far beyond the level of intervention of the specific project.

Coherence of policies and economic/social services is a recurrent condition for success. However all countries, regions or international organisations have experienced a diversified range of policy formulation, strategies and action plans at different level and on different issues.

Conventional policy formulation is often sector-oriented (agriculture, fisheries, forestry, transport, etc.) It creates a relation between the resources and the actors in a specific sector. To overcome this limited vision, inter-sectoral policies and management mechanisms have been established. In the last decade, and especially since the 1992 *United Nations Conference on Environment and Development* (UNCED), global issues have been raised which led to functional policies rather than sectoral ones. The following examples can be mentioned.

Table 8: Examples of “functional” policies

<i>Examples of existing functional policies</i>	<i>Main corresponding MFCAL functions</i>
Special Programmes for Food Security	<ul style="list-style-type: none"> • Food security
Structural Adjustment Programmes	<ul style="list-style-type: none"> • Economic development • Policies and institutions
National Environment Action Plans	<ul style="list-style-type: none"> • Environmental restoration, protection and enhancement • Management of land resources
National Physical Development Plans	<ul style="list-style-type: none"> • Management of land resources • Economic development
Actions plans for combat desertification	<ul style="list-style-type: none"> • Management of land resources • Environmental restoration, protection and enhancement
Special fertility initiatives	<ul style="list-style-type: none"> • Management of land resources

These functional policies often mean for the recipient countries an adjustment of institutional mandates and legal frameworks and the setting-up of co-ordinating mechanisms at all levels.

Although the horizontal approach to such issues is being increasingly promoted, the multifunctional character is often constrained by the organisation and administration of the institutions themselves, still vertically structured.

This multitude of policy instruments is sometime a matter of concern, because it can lead to some confusion, overlapping, conflicts over responsibilities and management of related resources (financial, technical, human). A common and standardised analytical tool such as the MFCAL approach could be of considerable use and could help prevent some of these bottlenecks by applying it systematically in all the relevant national or regional programmes dealing with agriculture and land management. It would help to harmonise the planning methodology, to fully appreciate the benefits of co-ordination and synergies between the various functional policies and to highlight the potential constraints and , as well as the factors of success of each of them and therefore to optimising the often limited human and financial resources.

3.3 CONCLUSIONS AND RECOMMENDATIONS

a) Conclusions

The assessment of case studies from a variety of sources and of different types demonstrates that the **MFCAL approach possesses several clear possible uses:**

- It could provide a wide and common analytical framework for all sectors, actor's activities related to the agriculture and land. Thus, at the micro level, all the 51 projects analysed in this report could be accommodated with the MFCAL approach and compared to each other within two wide groups of projects. (tables 6 and 7). At the macro level, the MFCAL approach appears as a possible tool to relate and compare different national plans and policies (table 8).
- It highlights functions rather than sectors and therefore is more directly linked to development issues and to development project objectives: for example food security, environmental restoration are functions referring directly to problems to be solved while development of crop intensification, irrigation are sectors that need to be considered to address these issues. In that sense the MFCAL approach appears well focused on basic development problems and needs.
- It embraces a multidimensional perspective which proved, in each of the 51 projects reviewed, to be a rapid and effective means of identifying several aspects of project development which otherwise would not be taken into consideration (see tables 6 and 7).
- It helps to analyse the complexity of links between factors of each specific situations or projects. The two projects presented in the boxes demonstrate well the relationships and even the dynamic between the subfunctions. Also, the comparison of all 51 projects, (annex) shows that each project remains a particular case, as the relations between functions are site, time and scale specific. Thus, the MFCAL seems to be a quite flexible framework, which can be adapted to all possible situations.
- It assists in identifying the possible synergies; gaps and complementarities between factors as all activities can be visualised and confronted within a general framework. This can contribute to better appreciate the dynamics of the issues at stake and support the decisions and the consequent actions at different levels. (see boxes 1 and 2)
- It clarifies the successful and limiting factors as well as impacts of development projects or programmes and in that sense allow to better capitalise the lessons learnt in different situations.(see annex, tables 6 and 7)

- It emphasises the organic or systemic dimension of the rural society (see figure 1) and holds a potential for the rationalisation of the different investments undertaken in that sector.
- It helps to evaluate the global capitalisation of an investment in all sectors even if not part of the original project objective. Thus, using the MFCAL approach, led to the improved assessment of projects aiming at food security in terms of their results on environmental protection and vice versa. (see tables 6 and 7). It is clear then, that the MFCAL approach offers a useful methodological tool for optimising the investments of an integrated rural development programme.
- It facilitates the dialogue between international development agencies as it recognises their mandate through the various functions. (e.g. mainly FAO is focussed on food security, IFAD on poverty alleviation, World bank on economic development, UNEP on resources restoration, etc.), The MFCAL approach could be an interesting base from which to accelerate ongoing UN system-wide attempts to rationale inter-agency collaboration on these issues.
- The MFCAL approach could also help to harmonise interventions at project level with the macroeconomic and policy decisions and trends by offering a common template applicable at both macro and micro levels.(see figure 2 and table 8)

However, despite its potential advantages, **the MFCAL approach may imply a series of possible risks:**

- It is a new approach which could lead to possible confusion when compared to other similar concepts dealing for exempla with cross-sectorial analysis or integrated approach.
- It is not yet studied enough to be proposed as a working framework. It would need refining and more in depth studies before being recognised and adopted by main stakeholders involved in dryland development.
- By emphasising the complexity and the linkages between functions, it takes the risk, in some cases, to promote cumbersome analytical processes and to create an ambiguity on priorities to be set up.

b) Some recommendations

The following simple recommendations could be derived from the present study:

First of all, the MFCAL approach requires further clarification. In particular, the study of the projects showed that the formulation of the main functions in the MFCAL approach relies, to a certain extent on subjective interpretation among the practitioners, which in itself, could contribute to a degree of unfixity and inconsistency. Many issues or impacts can easily be placed under different groups of functions according to the context or to the personal perspective. This can lead to misunderstandings and disagreements, which do not facilitate the required dialogue and harmonisation which one of the justification of the MFCAL approach. As a result, it is clear that the development of a clearer and more user-friendly version of the MFCAL approach should be considered a priority.

Secondly one of the current weaknesses of the MFCAL approach is that has not yet been tested on the full project cycle nor has it been concretely applied to the policy-making process. Any analysis, such as that used within this study, remains, for the time being,

necessarily *a posteriori*. Once the concept is clarified, it has to prove its usefulness in real conditions. Some pilot studies could be proposed such, for example:

- selecting a dryland country and analysing the full range of agriculture and land related policies using the MFCAL framework;
- Identifying a project or a set of drylands development projects (e.g.: CCD) and applying the MFCAL framework to them since the identification until the ex-post evaluation.

In conclusion then, this study has clearly demonstrated the potential utility of the MFCAL approach. It is both interesting and has a high potential added value in relation to important drylands questions. Further development and clarification of the MFCAL approach however is required. Above all, it is vital that the approach is tested and applied in clear operational contexts. Only then, will the full value of the approach be realised.

REFERENCES

- FAO, 23-27 June 1997. Rio Progress Reports.
- ASDI-PNUD, février 1999. Leçons du Terrain.
- IFAD, January 1998. *Drylands*.
- PNUD, Moscou 1987. *La mise en valeur des territoires arides et la lutte contre la désertification: stratégie intégrée*.
- JALDA (Japan Agricultural Land Development Agency), October 1996. *Symposium on Combat Desertification*.
- Ministerio de Agricultura de Chile/Corporación Nacional Forestal & Programa FAO/PNUMA – Desertificación – 1997. *Diagnóstico de la Desertificación en Chile*.
- FAO-PNUMA-CCD, 1997. *Programa de Acción Nacional contra la Desertificación. The Courier Africa-Caribbean-Pacific-European Union*, No. 172, November-December 1998.
- Michel Mortimore, 1998. *Roots in the African Dust – Sustaining the Drylands*.
- Union du Maghreb Arabe, 1998. *La lutte contre la Désertification dans les Pays de l'Union du Maghreb Arabe*.
- German Federal Ministry for Economic Cooperation and Development (BMZ), July 1997. *Combating Desertification: Experience of German Development Cooperation*.
- International Centre for Research in Agroforestry (ICRAF) & UNEP, Nairobi, Kenya, 1996. *Towards improved policy making for natural resources and ecosystem management in sub-Saharan Africa*.
- The Centre for Our Common Future in collaboration with the Interim Secretariat for the Convention to Combat Desertification, June, 1995. *Down to Earth*.
- Directorate General for Development Cooperation, Ministry of Foreign Affairs, September 1997. *Combating Drought and Desertification*.
- FAO/Italy Cooperative Programme, Tunis, August 1996. *Steps Towards a Participatory and Integrated Approach to Watershed Management*.
- FAO, 1992. *Le rôle de la foresterie dans la lutte contre la désertification*.

